

# ABSOLUTE, DIFFERENTIAL AND GAUGE PRESSURE TRANSMITTER FOR REMOTE SEAL(S)

## DATA SHEET

## FKB, FKB, FKM...F

FKB, FKB and FKM models of FCX-AII V5 series of pressure transmitters accurately measure a gauge, differential or absolute pressure and transmit a proportional 4-20 mA output signal. The transmitters use an unique micro-capacitive silicon sensor in combination with a state-of-the-art digital signal processing to provide exceptional performances in terms of accuracy and stability.

## FEATURES

### 1. High accuracy

The Fuji Electric's micro-capacitive silicon sensor provides in standard  $\pm 0.065\%$  accuracy for differential and gauge transmitter models and  $\pm 0.2\%$  accuracy for the absolute transmitter model, for all elevated or suppressed calibration ranges without additional adjustments.

### 2. Minimum inventory and design

Electronics unit, local indicators and electronics housing are interchangeable among all FCX-AII transmitters. Fuji Electric remote seals design are based on a welded conception that provides a reduced and optimized volume flange to guarantee a perfect vacuum tightness and high pressure services.

### 3. Minimum environmental influence

The Advanced Floating Cell technology provides a high immunity against temperature variations and overpressure commonly found in the process industry and substantially reduces the overall measurement error.

### 4. HART/Fuji Electric communication protocols

FCX-AII V5 series of pressure transmitters can communicate using either the universal HART or the proprietary and faster Fuji Electric communication protocol.

By the use of Device Description files, HART compatible devices can communicate with any FCX-AII V5 transmitter.

### 5. Application flexibility

Various options are available to address most of the process industry applications, including :

- Full range of hazardous area approvals
- Built-in RFI filter and lightning arrester
- Analog or 5 digits local indicator with engineering unit
- Stainless steel electronics housing
- Wide selection of materials
- High temperature, high vacuum seals

### 6. Programmable output Linearization Function

The output signal can be linearized using up to 14 pair-points.

### 7. Burnout current flexibility

The burnout current value can be adjusted in the ranges of [3.2 ; 4.0] and [20.0 ; 22.5] mA and can be compliant with NAMUR NE43 recommendations.



## FUNCTIONAL SPECIFICATIONS

### Type:

- FKB : differential pressure transmitter with remote seal(s)
- FKB : gauge pressure transmitter with remote seal
- FKM : absolute pressure transmitter with remote seal

### Service :

Liquid, gas, or vapour

### Span, range, and overrange limit :

Model	Span limits		Range limits
	Minimum	Maximum	
<b>FKD</b>			
	(mbar)	(mbar)	(mbar)
F□D□□3	3.2	320	± 320
F□D□□5	13	1300	± 1300
F□D□□6	50	5000	± 5000
F□D□□8	300	30000	± 30000
F□D□□9*	2000	200000	±200000
<b>FKB</b>			
	(bar)	(bar)	(bar)
F□B□□1	0.013	1,3	-1 to + 1,3
F□B□□2	0.05	5	-1 to + 5
F□B□□3	0.3	30	-1 to + 30
F□B□□4	1	100	-1 to + 100
F□B□□5	5	500	-1 to + 500
<b>FKM</b>			
	(bar abs)	(bar abs)	(bar abs)
F□M□□1	0.016	0.16	0 to +0,16
F□M□□2	0.013	1,3	0 to +1,3
F□M□□3	0.05	5	0 to +5
F□M□□4	0,3	30	0 to +30
F□M□□5	1	100	0 to +100

Remark : To minimize environmental influence, span should be greater than 1/40 of the max. span in most applications.

Important : For FKB#49, maximum possible overload pressure on LP side must be  $\leq 100$  bar. The accuracy is not guaranteed when used at negative DP.

**Output signal :**

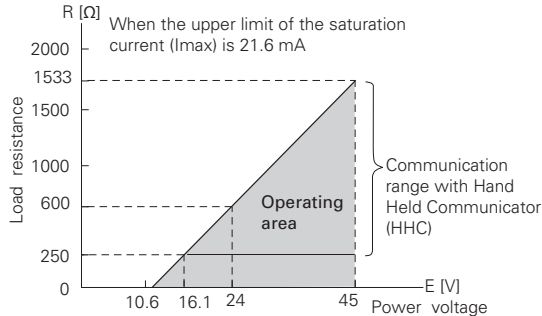
4-20 mA with digital signal superimposed on the analog signal.

**Power supply :**

10.5 to 45 V DC at transmitter terminals.  
10.5 to 32 V DC with the optional arrester.

Refer to hazardous location table for specific limitations.

**Load limitations :** see figure below



Note 1 : The load resistance varies with the upper limit of the saturation current (I max)

$$R [\Omega] = \frac{E [V] - 10.5}{(I_{max} [mA] + 0.9) \times 10^{-3}}$$

Note 2 : For communication with HHC (FXW model), a minimum load of 250 Ω is required.

**Hazardous locations :**

Marking (Digit 10 =)	Protection type	
<b>ATEX</b>	<b>Intrinsic Safety "i" :</b>	
	Ex II 1G/D	
	Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +70°C)	
	Ex ia IIC T5 Ga (-40°C ≤ Ta ≤ +50°C)	
	Ex ia IIIC T135°C Da (-40°C ≤ Ta ≤ +70°C)	
	Ex ia IIIC T100°C Da (-40°C ≤ Ta ≤ +50°C)	
	IP 66/67	
	<b>Electrical Parameters :</b>	
	Ui ≤ 28 Vdc, Ii ≤ 94.3 mA, Pi ≤ 0.66 W	
	Ci = 26 nF(1) / 36 nF(2), Li = 0.6 mH(3) / 0.7 mH(4)	
	<b>(K)</b>	<b>Flameproof Enclosure "d" :</b>
		Ex II 2G/D
		Ex d IIC T5 Gb (-40°C ≤ Ta ≤ +85°C)
		Ex d IIC T6 Gb (-40°C ≤ Ta ≤ +65°C)
		Ex tb IIIC T100°C Db (-40°C ≤ Ta ≤ +85°C)
Ex tb IIIC T85°C Db (-40°C ≤ Ta ≤ +65°C)		
45 Vdc max		
<b>(X)</b>	<b>Increased Safety "e" :</b>	
	Ex II 3G/D	
	Ex ec IIC T5 Gc (-40°C ≤ Ta ≤ +70°C)	
	Ex tc IIIC T100°C Dc (-40°C ≤ Ta ≤ +70°C)	
45 Vdc max		
<b>(P)</b>	<b>Combination (K) + (X)</b>	
	<b>(M)</b>	
<b>IECEX</b>	<b>Intrinsic Safety "i" :</b>	
	Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +70°C)	
	Ex ia IIC T5 Ga (-40°C ≤ Ta ≤ +50°C)	
	Ex ia IIIC T135°C Da (-40°C ≤ Ta ≤ +70°C)	
	Ex ia IIIC T100°C Da (-40°C ≤ Ta ≤ +50°C)	
	IP 66/67	
	<b>Electrical Parameters :</b>	
	Ui ≤ 28 Vdc, Ii ≤ 94.3 mA, Pi ≤ 0.66 W	
	Ci = 26 nF(1) / 36 nF(2), Li = 0.6 mH(3) / 0.7 mH(4)	
	<b>(T)</b>	<b>Flameproof Enclosure "d" :</b>
		Ex d IIC T5 Gb (-40°C ≤ Ta ≤ +85°C)
		Ex d IIC T6 Gb (-40°C ≤ Ta ≤ +65°C)
		Ex tb IIIC T100°C Db (-40°C ≤ Ta ≤ +85°C)
		Ex tb IIIC T85°C Db (-40°C ≤ Ta ≤ +65°C)
		45 Vdc max
<b>(R)</b>	<b>Increased Safety "e" :</b>	
	Ex ec IIC T5 Gc (-40°C ≤ Ta ≤ +70°C)	
	Ex tc IIIC T100°C Dc (-40°C ≤ Ta ≤ +70°C)	
	45 Vdc max	
<b>(Q)</b>	<b>Combination (T) + (R)</b>	
	<b>(N)</b>	
<b>ATEX</b>	<b>(W)</b>	
<b>IECEX</b>	<b>(V)</b>	
<b>cCSAus</b>	<b>(J) + (E)</b>	

cCSAus	Intrinsic safety / Non Incendive / Class 1 Division 2 :
(J)	IS Class I Division 1, Groups ABCD Ex ia
	Class II Groups EFG; Class III
	NI Class I Division 2, Groups ABCD
	(Per control drawing TC522873)
	Class I Division 2, Groups ABCD
	T4 (-40°C ≤ Ta ≤ +70°C)
(E)	T5 (-40°C ≤ Ta ≤ +50°C)
	Ui ≤ 28 Vdc, Ii ≤ 94.3 mA, Pi ≤ 0.66 W
	Ci = 26nF(1) / 36 nF(2), Li = 0.6 mH(3) / 0.7 mH(4)
	<b>Explosion proof</b>
	XP Class I Division 1, Groups CD
	Class II Groups EFG; Class III
(L)	T5 (-40°C ≤ Ta ≤ +85°C)
	T6 (-40°C ≤ Ta ≤ +65°C)
	Vmax = 42.4 Vdc
<b>Combination (J) + (E)</b>	

- (1) Without optional arrester
- (2) With optional arrester
- (3) Without analog indicator
- (4) With analog indicator

**Configuration :**

Configuration of the FCX-All V5 series of pressure transmitters can be carried out by either using a Hand Held Terminal (ie. Fuji Electric FXW or third party HART terminal) or the 3 push-buttons optional indicator.

A third party HART hand held communicator can be used in combination with Fuji Electric FCX-All V5 HART Device Description files (<https://fieldcommgroup.org>).

Functions	Fuji Electric FXW		Third party HART HHC		3 push buttons optional indicator	
	Display	Set	Display	Set	Display	Set
Tag Nb	v	v	v	v	v	v
Model Nb	v	v	v	v	v	v
Serial Nb & Software revision	v	—	v	—	v	—
Engineering units	v	v	v	v	v	v
Upper Range Value	v	—	v	—	v	—
Measuring Range	v	v	v	v	v	v
Damping	v	v	v	v	v	v
Output signal type	Linear	v	v	v	v	v
	Square Root	v	v	v	v	v
Burnout current	v	v	v	v	v	v
Calibration	v	v	v	v	v	v
Output Adjust	—	v	—	v	—	v
Measuring Value	v	—	v	—	v	—
Self Diagnosis	v	—	v	—	v	—
Printer (option)	v	—	—	—	—	—
External Adj Screw Lock	v	v	v	v	v	v
Transmitter Display	v	v	v	v	v	v
Linearization	—	—	v	v	v	v
Rerange	v	v	v	v	v	v
Saturation Current	v	v	v	v	v	v
Write Protect	v	v	v	v	v	v
History	—					
	— Calibration History	v	v	v	v	v
	— Ambient T° History	v	—	v	—	v

Note 1 : The FXW firmware revision must be higher than 7.0 in order to address FCX-All V5 "Saturation current", "Write protect" and "History" functions.

Note 2 : The "Linearization" function is not accessible through the 3 push-buttons optional indicator.

**Damping :**

The damping time constant can be adjusted within the range of [0.06 to 32] seconds.

**Zero and span adjustment :**

Zero and span are adjustable remotely with a Hand Held Communicator or locally with the external adjustment screw.

**Zero elevation/suppression :**

- ±100 % of the URL for FKD models
- 1 bar to +100 % of the URL for FKB models
- 0 kPa abs to +100 % of the URL for FKM models

**Normal/reverse action :**

Selectable from a Hand Held Communicator.

### Burnout and saturation currents :

If the self-diagnostic functions detect a transmitter failure, the burnout function will drive the output signal to either "Output Hold", "Output Overscale" or "Output Underscale" modes.

When "Output Hold" :

The output signal is held as the last value just before the failure happens.

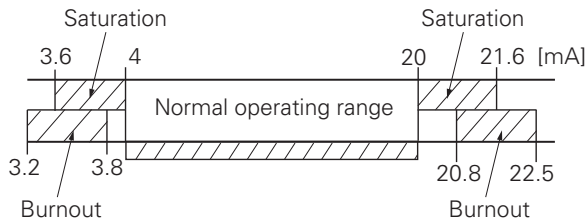
When "Output Overscale" :

The output signal is set within the range of [20.0 to 22.5] mA

When "Output Underscale" :

The output signal is set within the range of [3.2 to 4.0] mA

Both burnout and saturation current can be adjusted within the range of [3.2 ; 4.0] and [20.0 ; 22.5] mA



### Loop-check / fixed output currents :

The transmitter can be configured to provide a constant output signal from 3.2 up to 22.5 mA.

### Temperature limit :

Ambient :

- 40 to +85°C
- 20 to +80°C (for LCD indicator)
- 40 to +60°C (for arrester option)
- 20 to +60°C (for fluorinated oil)

Please refer to the hazardous locations table for ambient temperature limitations according to the standard and type of protection.

Process :

Refer to the seal specifications and the specific temperature conditions.

Storage :

- 40 to +90°C

### Humidity limit :

0 to 100% RH (Relative Humidity)

### Temperature effect :

Effect per 28°C change within the range of -40°C and +85°C

FKM model :

Zero shift :

$\pm(0.125 + 0.1 \times \text{URL}/\text{span})$  % of URL

Total effect :

$\pm(0.15 + 0.1 \times \text{URL}/\text{span})$  % of URL

FKB & FKD models :

Zero shift :

$\pm(0.075 + 0.0125 \times \text{URL}/\text{span})$  % of URL

Total effect :

$\pm(0.095 + 0.0125 \times \text{URL}/\text{span})$  % of URL

### Static pressure effect (FKD model) :

Zero shift :

$\pm 0.035\%$  of URL for 100 bar

### Overrange effect (FKB & FKM models) :

Zero shift :

0.2% of URL, for any overrange pressures (limited to the max. overrange pressure)

### Overrange effect (FKD model) :

Zero shift :  $\pm 0.15\%$  of URL / 160 bar limit

### Supply voltage effect :

Less than 0.005% of calibrated span per 1 V

### RFI effect :

< 0.2% of the URL for the frequencies from 20 up to 1000 MHz with an electrical field strength of 10 V/m and housing covers in place. (Classification : 2-abc : 0.2% of span according SAMA PMC 33.1)

### Update rate :

60 msec

### Response time : (At 63.3% of output signal without damping)

Time constant :

300 msec (FKD span code "3")

Time constant :

200 msec (others spans and FKB, FKM)

Dead time :

300 msec

Response time = time constant + dead time

### Mounting position effect :

Zero shift :

< 12 mm CE for 10° incline in any position.

This shift can be corrected with the zero adjustment.

This effect is doubled for fluorinated oil filling.

No influence on span adjustment.

### Vibration effect :

<  $\pm 0.25\%$  of span for spans greater than 1/10 of URL.

Frequency 10 to 150 Hz, acceleration 39.2 m/sec<sup>2</sup>.

These informations are available only for capillary mounting.

### Material fatigue :

Please consult Fuji Electric

### Dielectric strength :

500 V AC, 50/60 Hz 1 min., between circuit and earth (except with the optional arrester).

### Insulation resistance :

More than 100 MΩ / 500 V DC.

### Internal resistance for external field indicator :

12 Ω maxi (connected to test terminal CK+ and CK-)

### Pressure equipment directive (PED) 2014/68/EU

FKD : According to Article 4.3

FKB : Digit 6 code 1, 2, 3, 4 according to Article 4.3

Digit 6 code 5 : Category III model H1

FKM : According to Article 4.3

## PERFORMANCE SPECIFICATIONS

Reference conditions, silicone oil fill, SS 316L isolating diaphragms, 4-20 mA analog output.

### Accuracy rating : (including linearity, hysteresis, and repeatability)

For span > 1/10 of URL :

$\pm 0.065\%$  of calibrated span (FKB & FKD models)

$\pm 0.1\%$  of calibrated span for FKB□□5Vf model

$\pm 0.2\%$  of calibrated span for FKM model

For span < 1/10 of URL :

$\pm (0.015 + 0.005 \times \text{URL}/\text{span})$  % of span (FKB & FKD model)

$\pm (0.1 + 0.01 \times \text{URL}/\text{span})$  % of span (FKM model)

### Stability :

$\pm 0.2\%$  of upper range limit (URL) for 10 years.

### Linearity :

0.05% of calibrated span (FKB & FKD models)

0.1% of calibrated span (FKM model)

## PHYSICAL SPECIFICATIONS

### Conduit connections :

1/2"-14 NPT, Pg13.5 or M20x1.5

### Process-wetted parts material :

Diaphragm :

SS 316L, Hastelloy-C, Monel, Tantalum, Titanium or Zirconium

Flange face :

SS 316L, Hastelloy-C, Monel, Tantalum, Titanium or Zirconium

Extension :

SS 316L, Hastelloy-C (refer to "Model code")

### Non-wetted parts material :

Electronics housing :

Low copper die-cast aluminum alloy finished with polyester coating (standard), or SS 316 (option).

Bolts and nuts :

Standard :

Cr-Mo alloy

Option :

SS 316 (L) for pressure ≤ 100 bar or

SS 660 for pressure > 100 bar

Filling fluid :

Standard :

Silicone oil

Option :

Fluorinated oil

Mounting bracket :

SS 304L or SS 316L

### Environmental protection :

IEC IP66/IP67 and Type 4X

### Mounting bracket:

Without : direct mounting

With (option) : On 50 mm (2") pipe or direct wall mounting

### Mass {weight} :

Refer to outline dimensions page 12 to 17.

### Diaphragm seal(s) :

A comprehensive selection of seals can be chosen in accordance with the specific seal (see datasheet).

## OPTIONAL FEATURES

### Local indicator :

A plug-in analog indicator (2.5% accuracy) can be mounted into the electronics compartment or the terminal box of the housing.

An optional 5 digit indicator with engineering units is also available.

### Local configuration with the 3 push-buttons indicator :

A local configuration can be carried out with the optional 3 push-buttons 5-digits indicator.

### Arrester :

A built-in arrester protects the electronics from lightning surges.

Lightning surge immunity :

±4 kV (1.2 × 50 μs)

### NACE specification :

Metallic materials for all pressure boundary parts comply with NACE MR 0175/ISO 15156.

SS 660 bolts and nuts comply with NACE MR 0175/ISO 15156.

### Optional tag plate :

An extra stainless steel tag plate for customer tag data is wired to the transmitter.

### Vacuum service : See Fig.1

Special silicone oil and filling procedure are applied.

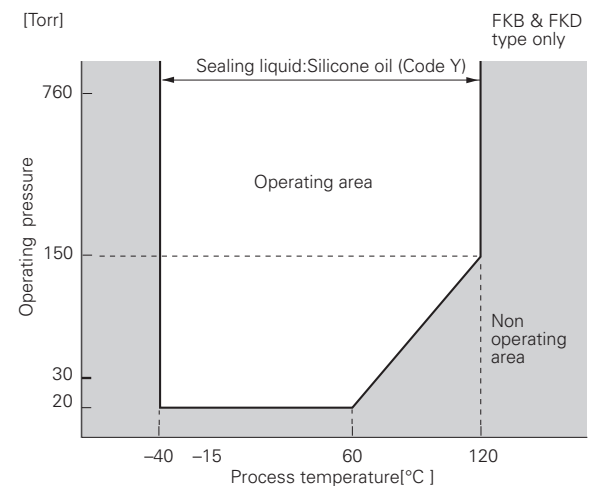


Fig. 1

Relation between process temperature and operating pressure

## ACCESSORIES

### Hand held communicator :

FXW model, refer to datasheet No.EDS 8-47

# MODEL CODE SYMBOLS - FKB

1	2	3	4	5	6	7	8	9	10	11	12	13	DESCRIPTION											
F	K	B				V	F	-																
													<b>Type</b> Gauge pressure transmitter with remote seal - Smart, 4-20 mA + HART/Fuji Electric communication protocol											
T	V	W	5	6	7	8					<b>Conduit connection</b>	<b>Enclosure type</b>												
							1/2 - 14 NPT Pg13.5 M20 x 1.5 G 1/2	"L" shape																
6	7	8					1/2 - 14 NPT Pg13.5 M20 x 1.5	"T" shape																
2	4	6	8	9	L	M	N	P					<b>(*)3 Diaphragm seal rating</b>											
									PN 25															
									PN 20 - 150 lbs															
									PN 50 - 300 lbs															
									PN 40															
									PN 16															
									PN 100 - 600 lbs															
									PN 150 - 900 lbs															
									PN 250 - 1500 lbs															
									PN 420 - 2500 lbs															
1	2	3	4	5					<b>(*)1 Measuring range</b>															
									<b>(*)2</b> 0.013 to 1.3 bar															
									<b>(*)2</b> 0.05 to 5 bar															
									0.3 to 30 bar															
									1 to 100 bar															
									<b>(*)3</b> 5 to 500 bar															
V	F	-	A					<b>Indicator</b>				<b>Arrester</b>												
V	F	-	B					None				None												
V	F	-	D					<b>(*)5</b> Analog, 0-100% linear scale				None												
V	F	-	J					<b>(*)5</b> Analog, Custom scale																
V	F	-	E					<b>(*)5</b> Analog, double scale																
V	F	-	F					None																
V	F	-	H					<b>(*)5</b> Analog, 0-100% linear scale				Yes												
V	F	-	K					<b>(*)5</b> Analog, Custom scale																
V	F	-	L					<b>(*)5</b> Analog, double scale																
V	F	-	L					Digital, 0-100%				None												
V	F	-	P					Digital, Custom scale																
V	F	-	Q					Digital, 0-100%				Yes												
V	F	-	S					Digital, Custom scale																
V	F	-	1					Digital, 0-100% with push button				None												
V	F	-	2					Digital, Custom scale with push button																
V	F	-	4					Digital, 0-100% with push button				Yes												
V	F	-	5					Digital, Custom scale with push button																
A	X	K	P	M	E	J	L	R	T	Q	N	W	<b>Hazardous location approvals</b>											
													None											
													<b>(*)7</b> ATEX - Flameproof											
													ATEX - Intrinsic Safety											
													ATEX - Increased Safety											
													<b>(*)7</b> ATEX - Combination Flameproof and Intrinsic Safety											
													<b>(*)7</b> cCSAus - Explosion proof											
													cCSAus - Intrinsic Safety and Non Incendive											
													<b>(*)7</b> cCSAus -Combination Explosion proof, Intrinsic Safety and Non Incendive											
													<b>(*)7</b> IECEx - Flameproof											
													IECEx - Intrinsic Safety											
													IECEx - Increased Safety											
													<b>(*)7</b> IECEx - Combination Flameproof and Intrinsic Safety											
													<b>(*)7</b> IECEx - ATEX - cCSAus - Explosion/Flameproof, Intrinsic Safety and Non Incendive											
B	L	M	G	S	T					<b>(*)4 Mounting design</b>				<b>Ambient temperature correction</b>										
													Capillary				Transmitter and diaphragm seal assembly							
													<b>(*)10</b> Rigid - Long design (in line)											
													<b>(*)10</b> Rigid - Short design (90°)				Transmitter							
													Capillary											
													<b>(*)10</b> Rigid - Long design (in line)											
													<b>(*)10</b> Rigid - Short design (90°)											
1	2	3	4	Y	Y	B	C	E	A	D	F	G	H	Y	J	K	L							
													<b>(*)6 Cell flange design</b>				<b>Stainless steel parts</b>							
													<b>(*)10</b> Operating pressure				<b>Bolts/nuts</b>				<b>Tag plate</b>		<b>Housing</b>	
1	2	3	4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							
													p ≤ 50 bar				None				None		None	
													<b>(*)9</b> 50 < p ≤ 100				Carbon steel				None		Yes	
													<b>(*)9</b> p ≤ 100 bar				SS 316(L) / SS 316(L)				None		Yes	
													<b>(*)8</b> p = 100 bar max				SS 660/SS 660				None		Yes	
													<b>(*)8</b> p = 100 bar max				SS 660/SS 660				Yes			

- Notes\* :
- Turn down ratio of 100 is possible but span greater than 1/40 of the URL is recommended for better performances.
  - For DN<50, please consult Fuji Electric regarding the process conditions
  - The flange rating is according to the Maximum Working Pressure. For PN > 150 bar, please consult Fuji Electric
  - For capillary version, the standard mounting bracket is provided. No mounting bracket with rigid mounting version.
  - Except digit 10 = "P", "Q"
  - Standard cell filling fluid = silicone oil. Other filling fluids upon request.
  - Only with digit 4 = "T", "W", "6", "8"
  - SS 660 bolts/nuts are in conformity with NACE MR0175/ISO 15156
  - SS 316L enclosure not available for "T" shape version
  - For rigid assembling, bolts and nuts are required. Please specify bolts and nuts material (digit 12), even if P < 50bar

MODEL CODE SYMBOLS - FKD

1 2 3 4 5 6 7 8 9 10 11 12 13													DESCRIPTION								
F	K	D				V	F	-				Y									
													<b>Type</b>								
													Differential pressure transmitter with remote seals - Smart, 4-20 mA + HART/Fuji Electric communication protocol								
T V W 5 6 7 8													<b>Conduit connection</b>		<b>Enclosure type</b>						
													1/2 - 14 NPT		"L" shape						
													Pg13.5								
													M20 x 1.5		"T" shape						
													G 1/2								
													1/2 - 14 NPT								
													Pg13.5								
													M20 x 1.5								
													(*11) <b>Diaphragm seal rating</b>								
2													PN 25								
4													PN 20 - 150 lbs								
6													PN 50 - 300 lbs								
8													PN 40								
9													PN 16								
L													PN 100 - 600 lbs								
M													PN 150 - 900 lbs								
N													(*9) PN 250 - 1500 lbs								
P													(*9) PN 420 - 2500 lbs								
													(*1) <b>Measuring range</b>								
3													(*2) 3,2 to 320 mbar								
5													(*2) 0,013 to 1,3 bar								
6													0,05 to 5 bar								
8													0,3 to 30 bar								
9													2 to 200 bar								
													<b>Indicator</b>		<b>Arrester</b>						
V	F	-	A													None		None			
V	F	-	B													(*4) Analog, 0-100% linear scale					
V	F	-	C													(*4) Analog, 0-100% √					
V	F	-	D													(*4) Analog, Custom scale					
V	F	-	J													(*4) Analog, double scale					
V	F	-	E													None					
V	F	-	F													(*4) Analog, 0-100% linear scale		Yes			
V	F	-	G													(*4) Analog, 0-100% √					
V	F	-	H													(*4) Analog, Custom scale					
V	F	-	K													(*4) Analog, double scale					
V	F	-	L													Digital, 0-100%		None			
V	F	-	M													Digital, 0-100% √					
V	F	-	P													Digital, Custom scale		Yes			
V	F	-	Q													Digital, 0-100%					
V	F	-	N													Digital, 0-100% √					
V	F	-	S													Digital, Custom scale					
V	F	-	1													Digital, 0-100% with push buttons		None			
V	F	-	2													Digital, Custom scale with push buttons					
V	F	-	3													Digital, 0-100% √ with push buttons					
V	F	-	4													Digital, 0-100% with push buttons		Yes			
V	F	-	5													Digital, Custom scale with push buttons					
V	F	-	6													Digital, 0-100% √ with push buttons					
													<b>Hazardous location approvals</b>								
A													None								
X													(*7) ATEX - Flameproof								
K													ATEX - Intrinsic Safety								
P													ATEX - Increased Safety								
M													(*7) ATEX - Combination Flameproof and Intrinsic Safety								
E													(*7) cCSAus - Explosion proof								
J													cCSAus - Intrinsic Safety and Non Incendive								
L													(*7) cCSAus -Combination Explosion proof, Intrinsic Safety and Non Incendive								
R													(*7) IECEX - Flameproof								
T													IECEX - Intrinsic Safety								
Q													IECEX - Increased Safety								
N													(*7) IECEX - Combination Flameproof and Intrinsic Safety								
W													(*7) IECEX - ATEX - cCSAus - Explosion/flameproof, Intrinsic Safety and Non Incendive								
													(*3) (*6) <b>Mounting design</b>		<b>Ambient temperature correction</b>						
B													Capillary on HP side		Transmitter and diaphragm seal assembly						
C													Capillary on HP & LP side								
E													(*12) Rigid short design on HP, capillary on LP side								
G													Capillary on HP side		Transmitter						
H													Capillary on HP & LP side								
													(*5) <b>Cell flange design</b>		<b>Stainless steel parts</b>						
													<b>Operating pressure</b>		<b>Bolts/nuts</b>		<b>Tag plate</b>		<b>Housing</b>		
1	Y													p ≤ 50 bar		None		None		None	
2	Y																	Yes		None	
3	Y																	None		Yes	
4	Y																	Yes		None	
Y	Y													50 < p ≤ 100		Carbon steel		None		None	
B	Y																	Yes		None	
C	Y																	None		Yes	
E	Y																	Yes		None	
A	Y													p ≤ 100 bar		SS 316(L) / SS 316(L)		None		None	
D	Y																	Yes		None	
F	Y																	None		Yes	
G	Y																	Yes		None	
H	Y													p = 100 bar max		SS 660/SS 660		None		None	
J	Y																	Yes		None	
K	Y																	None		Yes	
L	Y																	Yes		None	

- Notes\* :
- Turn down ration of 100 is possible but span greater than 1/40 of the the URL is recommended for better performances.
  - For DN<50, please consult Fuji Electric regarding the process conditions
  - For capillary version, the standard mounting bracket is provided. No mounting bracket with rigid mounting version.
  - Except Digit 10 = "P", "Q"
  - Standard cell filling fluid = silicone oil. Other filling fluids upon request.
  - Temperature correction must be done when diaphragm seals or capillarity lengths are different between HP and LP
  - Only with Digit 4 = "T", "W", "6", "8"
  - SS 660 bolts/nuts are in conformity with NACE MR0175/ISO 15156
  - High static pressure cell is mandatory.
  - SS 316L enclosure not available for "T" shape version
  - The flange rating is according to the Maximum Working Pressure
  - For rigid assembling, bolts and nuts are required. Please specify bolts and nuts material (digit 12), even if P < 50 bar

# MODEL CODE SYMBOLS - FKM

1 2 3 4 5 6 7 8 9 10 11 12 13															
F	K	M				V	F	-				Y			
									<b>DESCRIPTION</b>						
									<b>Type</b> Absolute pressure transmitter with remote seal - Smart, 4-20 mA + HART/Fuji Electric communication protocol						
									<b>Conduit connection</b> 1/2 - 14 NPT Pg13.5 M20 x 1.5 G 1/2 1/2 - 14 NPT Pg13.5 M20 x 1.5		<b>Enclosure type</b> "L" shape "T" shape				
									<b>(*)9 Diaphragm seal rating</b> PN 25 PN 20 - 150 lbs PN 50 - 300 lbs PN 40 PN 16						
									<b>(*)1 Measuring range</b> (*2) 0.016 to 0.16 bar abs (*2) 0.013 to 1.3 bar abs 0.05 to 5 bar abs 0.3 to 30 bar abs 1 to 100 bar abs						
V F - A V F - B V F - D V F - J V F - E V F - F V F - H V F - K V F - L V F - P V F - Q V F - S V F - 1 V F - 2 V F - 4 V F - 5												<b>Indicator</b> None (*4) Analog, 0-100% linear scale (*4) Analog, Custom scale (*4) Analog, double scale None (*4) Analog, 0-100% linear scale (*4) Analog, Custom scale (*4) Analog, double scale Digital, 0-100% Digital, Custom scale Digital, 0-100% Digital, Custom scale Digital, 0-100% with push buttons Digital, Custom scale with push buttons Digital, 0-100% with push buttons Digital, Custom scale with push buttons		<b>Arrester</b> None Yes None Yes None Yes	
									<b>Hazardous location approvals</b> None (*6) ATEX - Flameproof ATEX - Intrinsic Safety ATEX - Increased Safety (*6) ATEX - Combination Flameproof and Intrinsic Safety (*6) cCSAus - Explosion proof cCSAus - Intrinsic Safety and Non Incendive (*6) cCSAus -Combination Explosion proof, Intrinsic Safety and Non Incendive (*6) IECEx - Flameproof IECEx - Intrinsic Safety IECEx - Increased Safety (*6) IECEx - Combination Flameproof and Intrinsic Safety (*6) IECEx - ATEX - cCSAus - Explosion/flameproof, Intrinsic Safety and Non Incendive						
									<b>(*)3 Mounting design</b> Capillary Rigid - Long design (in line) Rigid - Short design (90°)		<b>Ambient temperature correction</b> Transmitter and diaphragm seal assembly Transmitter				
									<b>(*)5 Cell flange design</b> <b>Operating pressure</b> Bolts/nuts		<b>Stainless steel parts</b> <b>Tag plate</b> <b>Housing</b>				
1	Y														
2	Y														
3	Y														
4	Y														
Y	Y														
B	Y														
C	Y														
E	Y														
A	Y														
D	Y														
F	Y														
G	Y														
H	Y														
J	Y														
K	Y														
L	Y														
1	Y														
2	Y														
3	Y														
4	Y														
Y	Y														
B	Y														
C	Y														
E	Y														
A	Y														
D	Y														
F	Y														
G	Y														
H	Y														
J	Y														
K	Y														
L	Y														

- Notes :
- Turn down ration of 100 is possible but span greater than 1/40 of the the URL is recommended for better performances.
  - Please consult Fuji Electric regarding the process conditions
  - For capillary version, the standard mounting bracket is provided. No mounting bracket with rigid mounting version.
  - Except Digit 10 = "P", "Q"
  - Standard cell filling fluid = silicone oil. Other filling fluids upon request.
  - Only with Digit 4 = "T", "W", "6", "8"
  - SS 660 bolts/nuts are in conformity with NACE MR0175/ISO 15156
  - SS 316L enclosure not available for "T" shape version
  - The flange rating is according to the Maximum Working Pressure
  - For rigid assembling, bolts and nuts are required. Please specify bolts and nuts material (digit 12), even if P < 50bar

# SEAL DIAPHRAGMS

Fuji Electric seal diaphragms are dedicated to accurately measure level and density on open and closed tanks, flow and line pressure in pipes in heavy process conditions. The use of remote seal diaphragms avoids the measuring cell to be directly in contact with the process conditions. The various diaphragm architectures and the welded seal construction provide to the Fuji Electric remote seal diaphragm offer an excellent reliability in harsh processing conditions such as high static pressure, temperature or corrosiveness as well as viscous, crystallizable or abrasive process.



## FEATURES

### 1- Construction

Connection of the remote seal to the measuring cell diaphragms can be done either by a rigid (direct) or capillary architectures. The full welded Fuji Electric design allows a free of gasket path between the remote seal and the differential, gauge or absolute measuring cell of the FCX-AII V5 pressure transmitters. Depending the nature of the process, specific filling fluids are available to ensure the optimal transmission of the process pressure to the measuring cell.

### 2- Operating principle

The pressure is applied on the remote seal and transferred by the filling fluid through the capillary path to the measuring cell of the pressure transmitter.

### 3- Wide variety of materials selection

Depending the process conditions, wetted or non-wetted parts and filling fluids can be selected thanks to the model code definition. Wetted parts :

AISI 316L, Tantalum, Hastelloy, Monel, Titanium, Zirconium, AISI 316L with Gold or PFA coating.

Non wetted parts :

AISI 316L

Filling fluids :

Standard silicone, fluorinated, alimentary, high temperature, and vacuum specific oils.

For specific process conditions, please consult Fuji Electric.

### 4- Diaphragm seal types

According to the mounting and operating conditions different seal types can be useful :

Flush mounting design from DN40 to DN100.

Seals with extensions (50 to 200 mm).

Flanged, screwed or welded neck adapters

Seals for sanitary applications according DIN, SMS or Tri-Clamp standards.

For specific seals, please consult Fuji Electric.

## FUNCTIONAL SPECIFICATIONS

### Remote seal diaphragm assembling :

The remote seal can be assembled on the transmitter either by a direct (rigid) connection (as for level measurement at the bottom of a tank) or by capillary (distant measuring point, high temperature process).

The rigid assembling can be either "long design" (in line) or "short design" (90°) as shown in the outline dimension drawings.

	Rigid mounting	Capillary mounting
FKB	short or long design	HP side
FKM	short or long design	HP side
FKD	Refer to FKR level transmitter technical datasheet	HP and LP side HP side LP side

### Capillary tube specifications :

Standard capillary lengths :

1.5 / 3 / 6 m (other upon request)

Inside diameter :

1 mm standard

2 mm for vacuum service, high process temperature applications, short response time requirements

Smallest bending radius of the capillary : 100 mm

### Capillary tube sheathing possibilities :

Temperature limit :

PVC sleeve :

-10 to 80°C

Stainless steel sheath :

-40 to 350°C

### Process connection possibilities :

The remote seal diaphragms can be :

- For flush mounting

- With extension

- With mounting adapters mounting (flanged, screwed or welded neck).

The mounting adapter is dedicated to either adapt the remote seal to a specific process connection or increase the sensibility of the transmitter with special process conditions.



### Temperature limits :

Ambiant temperature :  
-40 to 85°C for transmitter

Process temperature :  
-40 to 150°C for rigid mounting, 0 to 350°C for capillary design, and high temperature filling fluid.

### Pressure limits :

Working pressure :  
Limited by the smallest value between the nominal flange rating of the seal diaphragm and the maximum working pressure of the transmitter.

Vacuum limit :  
Depends on the limit of the measuring cell and the filling fluid of the remote seal. For the differential or gauge pressure transmitter, the vacuum limit is 20 Torr or 27 mbar abs.

Only the absolute pressure transmitter can be used till absolute zero (FKM).

For process pressure < 20 Torr, please consult Fuji Electric.

### Process temperature effect :

Transmitters Seals	Effect (mbar/10°C)	
	FKB/FKM Gauge/absolute pressure	FKD differential pressure
DN50 / 2" SS 316L diaphragm	1.24	0.5
DN80 / 3" SS 316L diaphragm	0.17	0.09
DN80 / 3" other diaphragm materials	0.73	0.22
DN100 / 4" SS 316L diaphragm	0.08	0.05
Adaptor SS 316L diaphragm	0.17	0.09

### Static pressure effect for ΔP transmitter with stainless steel diaphragms (FKD transmitter with DN80 and DN100 seals) :

Zero shift :

± 0,2% of URL for flange rating, up to 40 bar or 300 lbs

### Response time : (mean values)

Oil filling	Code digit 7	Response time	
		0 to 320 mbar	0 to 1.3 bar
Std silicone oil	Y, G	0.15	0.037
Fluorinated oil	W,A,D	0.17	0.04
Oil for vacuum or high temperature	U, X	0.25	0.065

The indicated values are in seconds per meter of capillary length with internal tube diameter Ø 1 mm.

The indicated response time is based on a pressure change of 0 to 100% of the calibrated span at reference temperature of 20°C.

The indicated values do not include the response time of the transmitter.

## PERFORMANCE SPECIFICATIONS

To evaluate the global performances, both the transmitter and the remote seal diaphragm performances must be considered under the reference conditions : standard silicone oil filling, SS 316L seal diaphragm, 4-20 mA output in linear mode.

### Accuracy :

Assembling 1 or 2 remote seal diaphragms on a transmitter increases the accuracy error at reference conditions by 0,1% of the span.

### Ambiant temperature effect :

*Effect when only transmitter is corrected.*

*(See digit 11 code G, S, T of the FKB and FKM model codes and code G, H of the FKD model code).*

Transmitters Seals	Effect (mbar/10°C)			
	FKB/FKM Gauge / Abs. pressure	Capillary (m)	FKD Differential pressure	Capillary (m)
DN 50 / 2" - SS 316L diaphragm	2.03	1.5	0.48	0.32
DN 80 / 3" - SS 316L diaphragm	0.11	0.08	0.04	0.03
DN80 / 3" - other diaphragm materials	0.22	0.2	0.05	0.07
DN100 / 4" - SS 316L diaphragm	0.04	0.03	0.02	0.01
Adaptor - SS 316L diaphragm	0.11	0.08	0.04	0.03

Note : the indicated values are in mbar/10°C for capillary length of 1m and internal capillary tube ø of 1 mm

*Effect when both the transmitter and the seal assembly are corrected. (See codes B,C,L,M digit 11 of the FKB, FKD and FKM model codes).*

The correction of the zero drift can be done at factory level on the complete system (transmitter and remote seals) by an additional temperature correction operation..

A thermal isolation or a heating of the capillaries minimises the ambient temperature effect.

### Filling fluid of the diaphragm seals :

Code digit 7	Designation	Temperature resistance (°C)		Density (25°C)
		P abs ≥ 1 bar	P abs < 1 bar	
Y	Silicone oil	-40 to 180	-40 to 120	0.95
W	Fluorinated oil	-20 to 200	-20 to 120	1.84
F	Sanitary fill fluids	-10 to 250	-10 to 120	0.94
V	Silicone oil		20 to 200	1.07
U	Silicone oil	0 to 300	20 to 200	1.07
X	Silicone oil	-10 to 350	20 to 200	1.09

The indicated values and limits are indicated for the most common applications (standard filling fluids).

Please consult Fuji Electric for special applications indicating your temperature, pressure and vacuum conditions (vacuum and temperature can occur together).

Other filling fluids can be used for your applications.

MODEL CODE SYMBOLS - S

1	2	3	4	5	6	7	8	DESCRIPTION	
S								<b>Remote seal diaphragms</b>	
								<b>Flange / Capillary connection</b>	
A								Axial	
R								Radial - Not possible with rigid assembling design (digit 6 = "R")	
W								Wafer type - Not possible with rigid assembling design (digit 6 = "R")	
								<b>(*1) Flanges RF (flange size and rating)</b>	
4								ANSI-150 Lbs 3" / ISO PN20 DN80	
5								ANSI-150 Lbs 4" / ISO PN20 DN100	
6								ANSI-300 Lbs 3" / ISO PN50 DN80	
7								ANSI-300 Lbs 4" / ISO PN50 DN100	
8								DIN PN40 DN80	
9								DIN PN16 DN100	
H								(*2) ANSI-150 lbs 2" / ISO PN20 DN50	
J								(*2) ANSI-300 lbs 2" / ISO PN50 DN50	
G								(*2) DIN PN40 DN50	
K								(*11) G 2" screwed seal	
L								(*11) G 1 1/2" screwed seal	
U								PN25 DN50 - coupling nuts      DIN 11851      Digit 4 = "V" only	
V								PN40 DN50 - coupling nuts      SMS      Digit 4 = "V" only	
W								PN40 DN50 - seal only      Clamp      Digit 4 = "V" only	
X								No dead volume      Sanitary      Digit 4 = "V" only	
A								(*3) Flange adapter PN40 DN25      Digit 4 = "V" only - others upon request	
B								(*3) Flange adapter ISO PN20 DN25 (1"-150 ANSI)      Digit 4 = "V" only - others upon request	
C								(*3) Flange adapter ISO PN50 DN25 (1"- 300 ANSI)      Digit 4 = "V" only - others upon request	
D								(*3) Flange adapter PN40 DN40      Digit 4 = "V" only - others upon request	
E								(*3) Flange adapter ISO PN20 DN40 (1"1/2 - 150 ANSI)      Digit 4 = "V" only - others upon request	
F								(*3) Flange adapter ISO PN50 DN40 (1"1/2 - 300 ANSI)      Digit 4 = "V" only - others upon request	
S								(*3) Screwed 1/2 NPTE      Digit 4 = "V" only - others upon request	
T								(*3) To be welded (2"1/2 pipe)      Digit 4 = "V" only - others upon request	
								<b>Seal diaphragm design</b>	
								<b>Diaphragm</b> <b>Seal land surface</b> <b>Flange</b>	
V								(*4) SS 316L      SS 316L      rowspan="6">SS 316L	
H								Hastelloy-C      Hastelloy-C	
B								Monel      Monel	
T								Tantalum      Tantalum	
P								(*9) Titanium      Titanium	
R								(*9) Zirconium      Zirconium	
C								SS 316L + gold coating      SS 316L	
F								(*5) SS 316L + PFA lining      SS 316L + PFA lining	
								<b>Seal diaphragm design</b>	
								Flush mounting	
Y								(*6) Diaphragm extension 50 mm      Digit 4 = "V"	
A								(*6) Diaphragm extension 100 mm      Digit 4 = "V"	
B								(*6) Diaphragm extension 150 mm      Digit 4 = "V"	
C								(*6) Diaphragm extension 200 mm      Digit 4 = "V"	
D								(*6) Diaphragm extension 50 mm      Digit 4 = "H"	
E								(*6) Diaphragm extension 100 mm      Digit 4 = "H"	
F								(*6) Diaphragm extension 150 mm      Digit 4 = "H"	
G								(*6) Diaphragm extension 200 mm      Digit 4 = "H"	
H								(*6) Diaphragm extension 50 mm      Digit 4 = "B"	
J								(*6) Diaphragm extension 100 mm      Digit 4 = "B"	
K								(*6) Diaphragm extension 150 mm      Digit 4 = "B"	
L								(*6) Diaphragm extension 200 mm      Digit 4 = "B"	
M								(*6) Diaphragm extension 50 mm      Digit 4 = "T"	
P								(*6) Diaphragm extension 100 mm      Digit 4 = "T"	
R								(*6) Diaphragm extension 150 mm      Digit 4 = "T"	
S								(*6) Diaphragm extension 200 mm      Digit 4 = "T"	
T								(*6) Diaphragm extension 200 mm      Digit 4 = "T"	
								<b>Remote seal assembling characteristics</b>	
								<b>Mounting assembly</b> <b>Length</b> <b>Protection</b>	
A								Capillary	
B									1,5 m
C									3 m
D									6 m
G								Upon request	
H								1,5 m	
K								3 m	
L								6 m	
R								Upon request	
								Rigid assembly for FKB, FKD & FKM - Not possible with digit 2 = "R", "W" - Maximum process temperature: 150 °C	
								Rigid assembly for FKP & FKH - Not possible with digit 2 = "R", "W" - Maximum process temperature: 150 °C	
								<b>Specific applications and filling fluids for the remote seal</b>	
								<b>Treatment</b> <b>Filling fluids</b>	
Y								None (standard)      Silicone oil	
W								None (standard)      Fluorinated oil	
F								None (standard)      Sanitary fill fluid	
D								Chlorine service      Fluorinated oil	
G								Degreasing      Silicone oil	
A								Oxygen service      Fluorinated oil - Digit 4 = "V" only	
N								NACE MR 0175 / ISO 15156      Silicone oil	
U								(*8) Vacuum service - maximum T° 200°C      Silicone oil	
V								(*8) Very high temperature (0 to 300°C) - No vacuum	
X								(*8) Very high temperature (20 to 350°C) - No vacuum	
								<b>Special options</b>	
								(*10) Special, no code available	

- \* Notes :
- Standard seal land surface finishing (stock finish). Other finishing (recess, groove...): please consult Fuji Electric.  
For material codes H, B, T, P, R, F: smooth finishing
  - Only available for P > 1 bar. Please consult Fuji Electric regarding the process conditions
  - Only for axial seal diaphragm connection - No extension possible
  - SS 316L for DN50, 80, 100 and flange adapter
  - Not possible with digit 7 = "V", "U" and "X"
  - All wetted parts in the same material (diaphragm, extension and seal land surface). Available for digit 3 = 4, 5, 6, 7, 8, 9, H, J, G - Other remote seal on demand
  - Vacuum service and high temperature > 120 °C : internal capillary diameter = 2mm
  - Please consult Fuji Electric regarding the process conditions (minimum pressure, maximum temperature)
  - Maximum process temperature : 150°C
  - When no code can be found in the current model code, place "\*" in the corresponding digit code as well as in the 16th digit
  - Only for FKP, FKH and rigid assembly. P > 1.3 bar

## ELECTROMAGNETIC COMPATIBILITY

All FCX-All series of pressure transmitters are in conformity with the provision of the EMC Directive 2014/30/EU on the harmonization of the laws of the Members States relating to electromagnetic compatibility.

All these models of pressure transmitters are in accordance with the following harmonized standards :

- **EN 61326-1** (*Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*).
- **EN 61326-2-3** (*Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning*).

### Emission limits (according to EN 55011 / CISPR 11, Group 1 Class A)

Frequency range (MHz)	Limits	Result
30 to 230	40 dB ( $\mu\text{V/m}$ ) quasi peak, measured at 10 m distance	Passed
230 to 1000	47 dB ( $\mu\text{V/m}$ ) quasi peak, measured at 10 m distance	

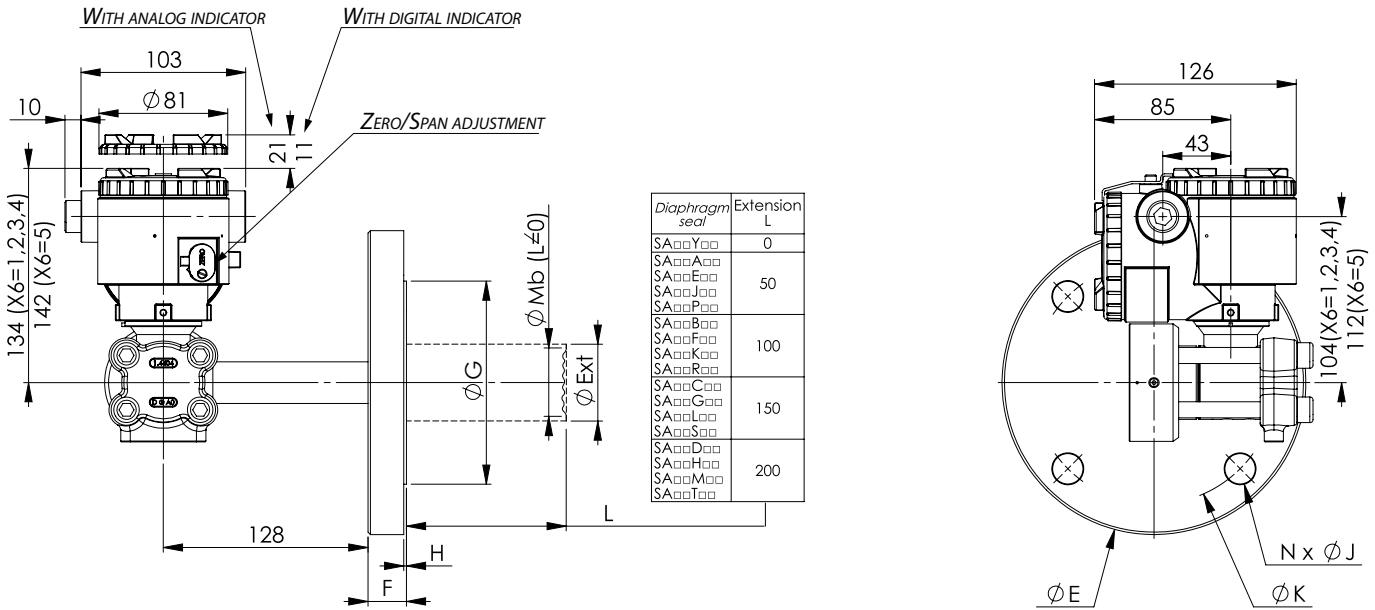
### Immunity

Phenomenon	Test value	Standard	Required Performance criteria	Result of criteria
Electrostatic Discharge	$\pm 4$ kV (Contact) $\pm 8$ kV (Air)	EN/IEC 61000-4-2	<b>B</b>	<b>A</b>
Radiated, Electromagnetic Field	10 V/m (0.08 to 1.0 GHz) 3 V/m (1.4 to 2.0 GHz) 1 V/m (2.0 to 2.7 GHz)	EN/IEC 61000-4-3	<b>A</b>	<b>A</b>
Fast transients (burst)	2 kV (5/50 ns, 5 kHz)	EN/IEC 61000-4-4	<b>B</b>	<b>A</b>
Surge Transients	1 kV Line to line 2 kV Line to ground	EN/IEC 61000-4-5	<b>B</b>	<b>A</b>
Conducted RF Disturbances	3 Vrms (150 kHz to 80 MHz) 80% AM @ 1 kHz	EN/IEC 61000-4-6	<b>A</b>	<b>A</b>
Power Frequency Magnetic Field	30 A/m (50 Hz, 60 Hz)	EN/IEC 61000-4-8	<b>A</b>	<b>A</b>

Performance criteria (A & B): according to IEC 61326

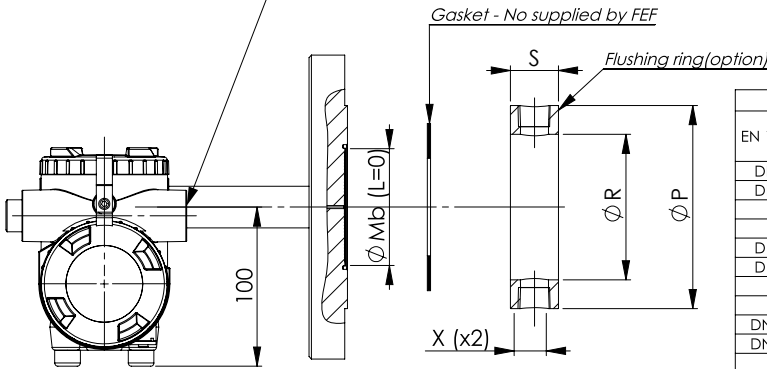
OUTLINE DIMENSIONS FOR RIGID MOUNTED DIAPHRAGM SEAL ON A GAUGE OR AN ABSOLUTE PRESSURE TRANSMITTER (units : mm) - Dimensions of seals - Refer to page 18 and 19

Short mounting design



code X4	CONDUIT CONNECTION
T	1/2 - 14 NPT
V	Pg 13,5
W	M20 X 1,5

WEIGHT :  
 TRANSMITTER ONLY : - 4 KG (WITHOUT OPTION)  
 ADD : - FLANGES WEIGHT (SEE TABLE)  
 - 0,3 KG FOR INDICATOR OPTION  
 - 2 KG FOR STAINLESS STEEL HOUSING OPTION



FLUSHING RINGS DIMENSIONS					
EN 1092-1	EN 1759-1	TROUS / HOLES X	ØP	ØR	S
DN 50		1/4-18 NPT	102	70	30
DN 50		1/2-14 NPT	102	70	30
	NPS 2"	1/4-18 NPT	92	70	30
	NPS 2"	1/2-14 NPT	92	65	30
DN 80		1/4-18 NPT	138	91	30
DN 80		1/2-14 NPT	138	91	30
	NPS 3"	1/2-14 NPT	127	91	30
	NPS 3"	1/4-18 NPT	127	91	30
DN 100		1/4-18 NPT	162	116	30
DN 100		1/2-14 NPT	162	116	30
	NPS 4"	1/4-18 NPT	157	116	30
	NPS 4"	1/2-14 NPT	157	116	30

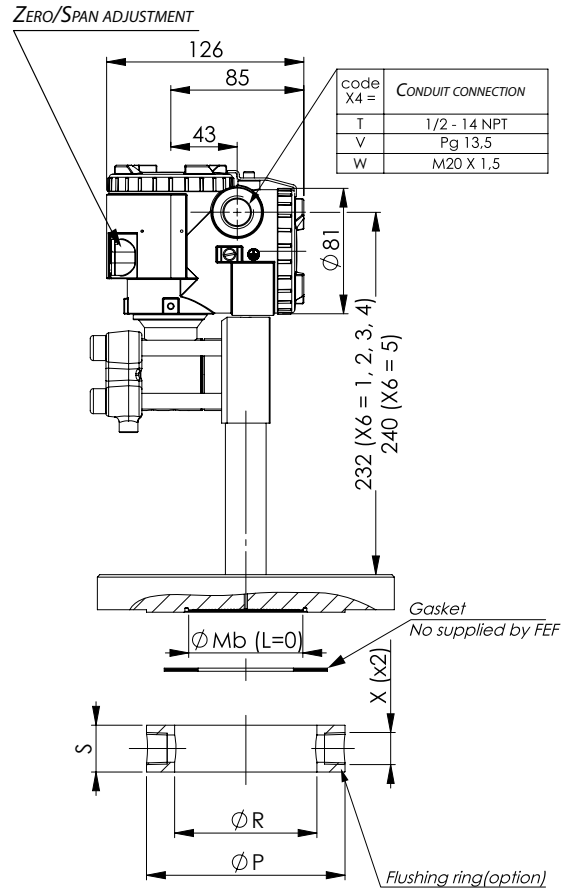
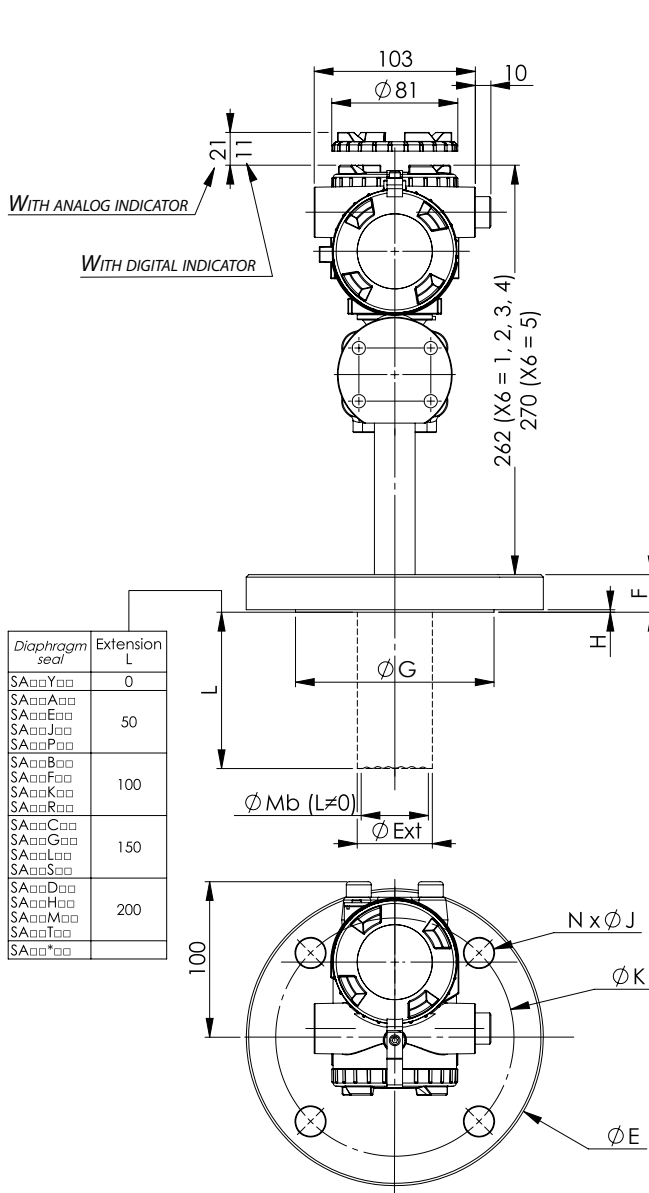
ØMb = Ø diaphragm  
 ØExt = extension  
 Wetted parts material

FLANGES DIMENSIONS ACCORDING TO EN 1092-1 & EN 1759-1										SS 316L				Exotic material	
diaphragm seal	EN 1092-1	EN 1759-1	ØE	F min	ØG	H	N x ØJ	ØK	Weight (kg)	L=0 ØMb	L=0 ØExt=ØMb	L=0 ØMb	L=0 ØExt(ØMb)	L=0 ØMb	L=0 ØExt(ØMb)
SAG0000	DN50 PN40		165	20	102	2	4 x 18	125	3,3	59	48	59	48,3 (47)		
SAH0000		2" CLASS 150	152	21	92	1,6	4 x 19	120,6	2,7	59	48	59	48,3 (47)		
SAJ0000		2" CLASS 300	165	22,5	92	1,6	8 x 19	127	3,7	59	48	59	48,3 (47)		
SA80000	DN80 PN40		200	24	138	2	8 x 18	160	5,8	73	73	89	76 (72)		
SA40000		3" CLASS 150	190	24	127	1,6	4 x 19	152,4	5,3	73	73	89	76 (72)		
SA60000		3" CLASS 300	210	28,5	127	1,6	8 x 22,2	168,3	7,8	73	73	89	76 (72)		
SA90000	DN100 PN16		220	22	158	2	8 x 18	180	5,9	96	96	89	94 (89)		
SA50000		4" CLASS 150	229	24	157	1,6	8 x 19	190,5	7,7	96	96	89	94 (89)		
SA70000		4" CLASS 300	254	32	157	1,6	8 x 22,2	200	12,7	96	96	89	94 (89)		

Seal diaphragm												SPAN LIMIT		
X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	Min.	Max.
F	K	B					V					Y	FKB001	1.3 kPa (0,013 bar)
													FKB002	5 kPa (0,05 bar)
													FKB003	30 kPa (0,3 bar)
													FKB004	100 kPa (1 bar)
													FKB005	500 kPa (5 bar)

X<sub>11</sub> = M, T

# Long mounting design



FLUSHING RINGS DIMENSIONS					
EN 1092-1	EN 1759-1	HOLES X	ØP	ØR	S
DN 50		1/4-18 NPT	102	70	30
DN 50		1/2-14 NPT	102	70	30
	NPS 2"	1/4-18 NPT	92	65	30
	NPS 2"	1/2-14 NPT	92	65	30
DN 80		1/4-18 NPT	138	91	30
DN 80		1/2-14 NPT	138	91	30
	NPS 3"	1/4-18 NPT	127	91	30
	NPS 3"	1/4-18 NPT	127	91	30
DN 100		1/4-18 NPT	162	116	30
DN 100		1/2-14 NPT	162	116	30
	NPS 4"	1/4-18 NPT	157	116	30
	NPS 4"	1/2-14 NPT	157	116	30

FLANGES DIMENSIONS ACCORDING TO EN 1092-1 & EN 1759-1									SS 316L				Exotic material		
diaphragm seal	EN 1092-1	EN 1759-1	ØE	F min	ØG	H	N x ØJ	ØK	Weight (kg)	L=0 ØMb	L#0 ØExt=ØMb	L=0 ØMb	L#0 ØExt(ØMb)		
SAG□□□□	DN50 PN40		165	20	102	2	4 x 18	125	3,3	59	48	59	48,3 (47)		
SAH□□□□		2" CLASS 150	152	21	92	1,6	4 x 19	120,6	2,7	59	48	59	48,3 (47)		
SAJ□□□□		2" CLASS 300	165	22,5	92	1,6	8 x 19	127	3,7	59	48	59	48,3 (47)		
SA8□□□□	DN80 PN40		200	24	138	2	8 x 18	160	5,8	73	73	89	76 (72)		
SA4□□□□		3" CLASS 150	190	24	127	1,6	4 x 19	152,4	5,3	73	73	89	76 (72)		
SA6□□□□		3" CLASS 300	210	28,5	127	1,6	8 x 22,2	168,3	7,8	73	73	89	76 (72)		
SA9□□□□	DN100 PN16		220	22	158	2	8 x 18	180	5,9	96	96	89	94 (89)		
SA5□□□□		4" CLASS 150	229	24	157	1,6	8 x 19	190,5	7,7	96	96	89	94 (89)		
SA7□□□□		4" CLASS 300	254	32	157	1,6	8 x 22,2	200	12,7	96	96	89	94 (89)		

Wetted parts material

ØMb = Ø diaphragm  
ØExt = extension

WEIGHT :  
TRANSMITTER ONLY: - 4 KG (WITHOUT OPTION)  
ADD: - FLANGES WEIGHT (SEE TABLE)  
- 0,3 KG FOR INDICATOR OPTION  
- 2 KG FOR STAINLESS STEEL HOUSING OPTION

X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub>- X<sub>9</sub> X<sub>10</sub>X<sub>11</sub>X<sub>12</sub>X<sub>13</sub>  
F K B □ □ □ □ V F - □ □ □ □ Y  
X<sub>11</sub> = L, S

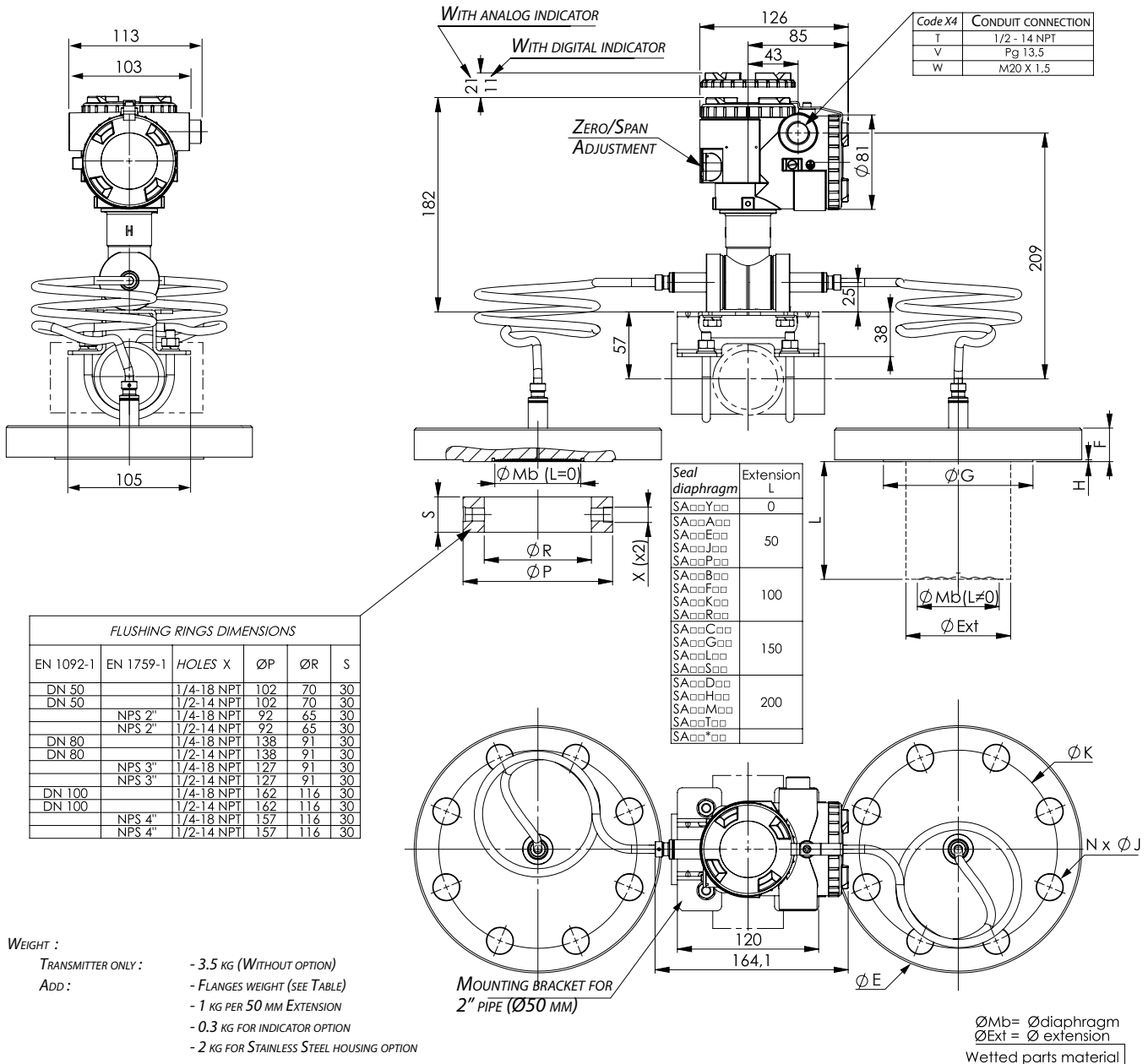
Seal diaphragm :

X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub>  
S A □ □ □ □ □ □

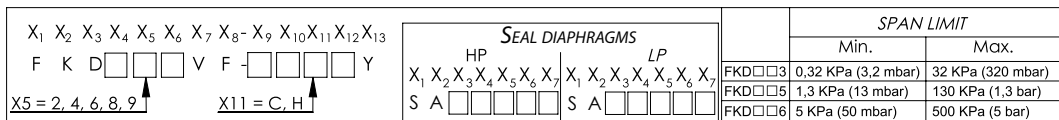
	SPAN LIMIT	
	Min.	Max.
FKB□□1	1,3 kPa (0,013 bar)	100 kPa (1,3 bar)
FKB□□2	5 kPa (0,05 bar)	500 kPa (5 bar)
FKB□□3	30 kPa (0,3 bar)	3 MPa (30 bar)
FKB□□4	100 kPa (1 bar)	10 MPa (100 bar)
FKB□□5	500 kPa (5 bar)	50 MPa (500 bar)

**OUTLINE DIMENSIONS FOR CAPILLARY MOUNTED DIAPHRAGM SEAL(S) ON A DIFFERENTIAL PRESSURE TRANSMITTER (units : mm) - Dimensions of seals - Refer to page 18 and 19**

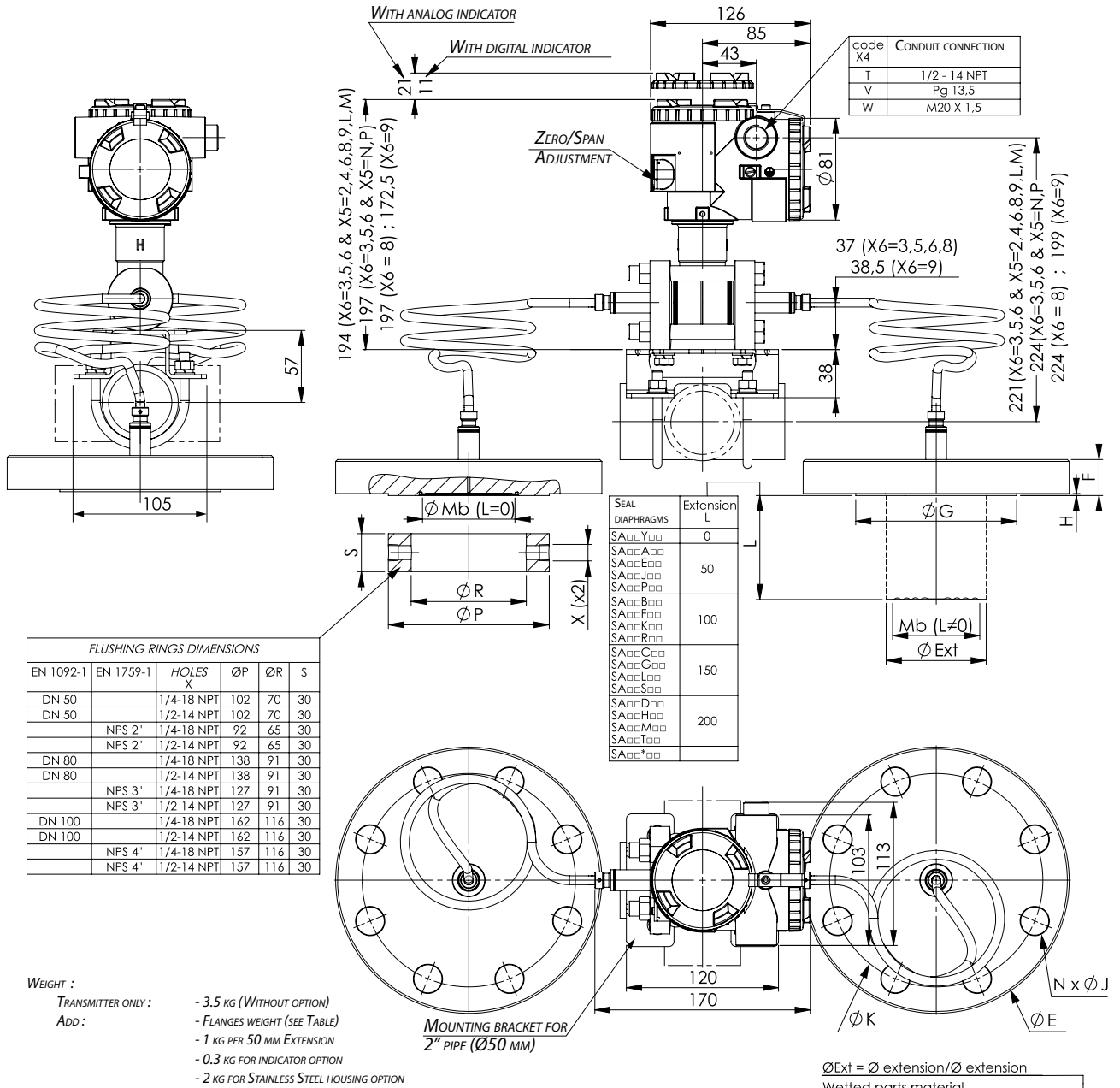
**For PN ≤ 50bar : reduced volume flanges are welded on the measuring cell**



**WEIGHT :**  
 TRANSMITTER ONLY : - 3.5 KG (WITHOUT OPTION)  
 ADD: - FLANGES WEIGHT (SEE TABLE)  
 - 1 KG PER 50 MM EXTENSION  
 - 0.3 KG FOR INDICATOR OPTION  
 - 2 KG FOR STAINLESS STEEL HOUSING OPTION



For PN > 50bar : reduced volume flanges are welded and bolted on the measuring cell



FLUSHING RINGS DIMENSIONS

EN 1092-1	EN 1759-1	HOLES X	ØP	ØR	S
DN 50		1/4-18 NPT	102	70	30
DN 50		1/2-14 NPT	102	70	30
	NPS 2"	1/4-18 NPT	92	65	30
	NPS 2"	1/2-14 NPT	92	65	30
DN 80		1/4-18 NPT	138	91	30
DN 80		1/2-14 NPT	138	91	30
	NPS 3"	1/4-18 NPT	127	91	30
	NPS 3"	1/2-14 NPT	127	91	30
DN 100		1/4-18 NPT	162	116	30
DN 100		1/2-14 NPT	162	116	30
	NPS 4"	1/4-18 NPT	157	116	30
	NPS 4"	1/2-14 NPT	157	116	30

- WEIGHT :
- TRANSMITTER ONLY : - 3.5 KG (WITHOUT OPTION)
  - ADD : - FLANGES WEIGHT (SEE TABLE)
  - 1 KG PER 50 MM EXTENSION
  - 0.3 KG FOR INDICATOR OPTION
  - 2 KG FOR STAINLESS STEEL HOUSING OPTION

FLANGES DIMENSIONS ACCORDING TO EN 1092-1 & EN 1759-1

Seal diaphragms	EN 1092-1	EN 1759-1	ØE	F min	ØG	H	N x ØJ	ØK	Weight (kg)	SS 316L		Exotic material	
										L=0 ØMb	L=Ø Ext=ØMb	L=0 ØMb	L=Ø Ext(ØMb)
SAG□□□□	DN50 PN40		165	20	102	2	4 x 18	125	3.3	59	48	59	48.3 (47)
SAH□□□□		2" CLASS 150	152	21	92	1.6	4 x 19	120.6	2.7	59	48	59	48.3 (47)
SAJ□□□□		2" CLASS 300	165	22.5	92	1.6	8 x 19	127	3.7	59	48	59	48.3 (47)
SA8□□□□	DN80 PN40		200	24	138	2	8 x 18	160	5.8	73	73	89	76 (72)
SA4□□□□		3" CLASS 150	190	24	127	1.6	4 x 19	152.4	5.3	73	73	89	76 (72)
SA6□□□□		3" CLASS 300	210	28.5	127	1.6	8 x 22.2	168.3	7.8	73	73	89	76 (72)
SA9□□□□	DN100 PN16		220	22	158	2	8 x 18	180	5.9	96	96	89	94 (89)
SA5□□□□		4" CLASS 150	229	24	157	1.6	8 x 19	190.5	7.7	96	96	89	94 (89)
SA7□□□□		4" CLASS 300	254	32	157	1.6	8 x 22.2	200	12.7	96	96	89	94 (89)

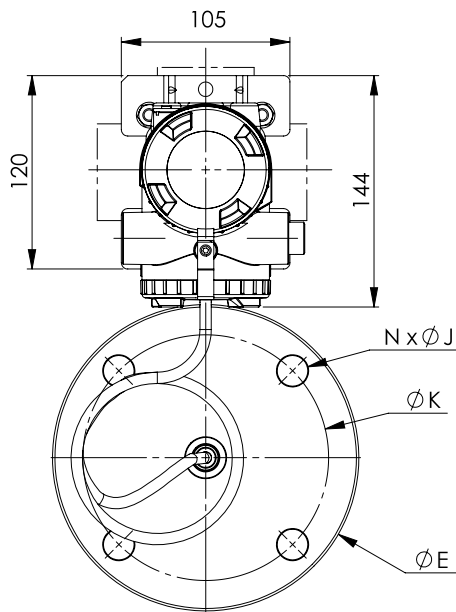
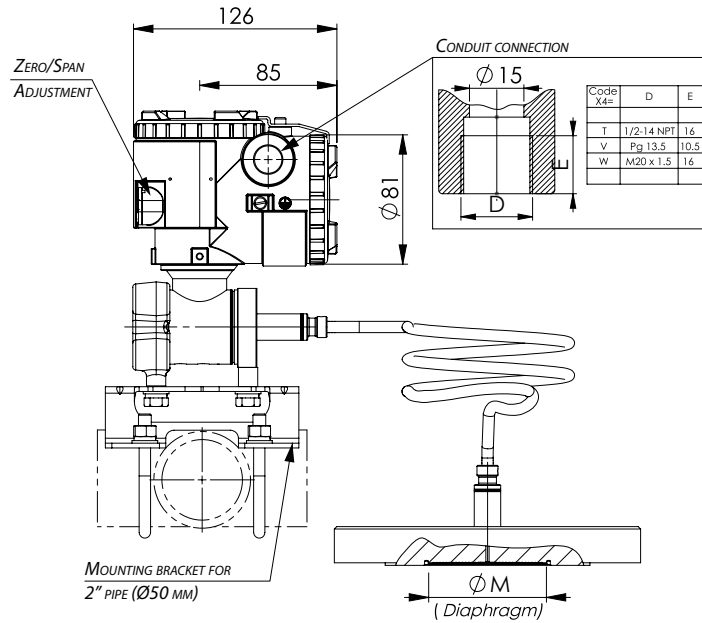
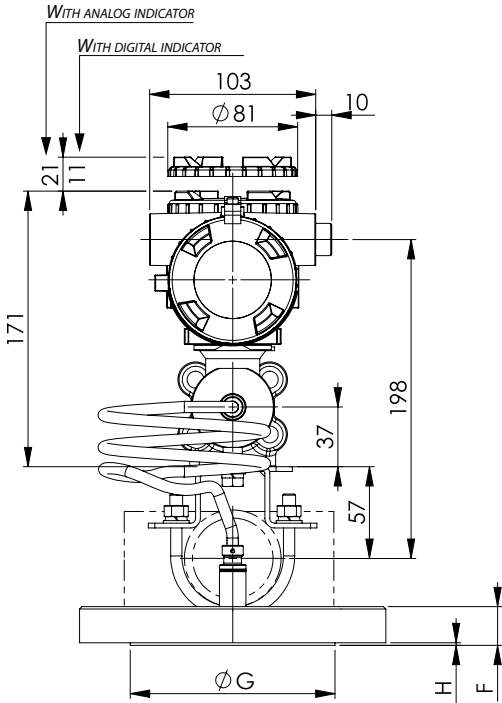
X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub>- X<sub>9</sub> X<sub>10</sub>X<sub>11</sub>X<sub>12</sub>X<sub>13</sub>  
 F K D □ □ □ V F - □ □ □ □ Y  
 ↑ X<sub>11</sub> = C, H

SEAL DIAPHRAGMS  
 HP X<sub>1</sub>X<sub>2</sub>X<sub>3</sub>X<sub>4</sub>X<sub>5</sub>X<sub>6</sub>X<sub>7</sub> LP X<sub>1</sub>X<sub>2</sub>X<sub>3</sub>X<sub>4</sub>X<sub>5</sub>X<sub>6</sub>X<sub>7</sub>  
 S A □ □ □ □ □ S A □ □ □ □ □

SPAN LIMIT  
 Min. Max.  
 FKD□□3 0,32 KPa (3.2 mbar) 32 KPa (320 mbar)  
 FKD□□5 1,3 KPa (13 mbar) 130 KPa (1,3 bar)  
 FKD□□6 5 KPa (50 mbar) 500 KPa (5 bar)  
 FKD□□8 30 KPa (300 mbar) 3 MPa (30 bar)

**OUTLINE DIMENSIONS FOR CAPILLARY MOUNTED DIAPHRAGM SEAL(S) ON A GAUGE OR AN ABSOLUTE PRESSURE TRANSMITTER (units : mm) - Dimensions of seals - Refer to page 18 and 19**

**For PN ≤ 50bar : reduced volume flanges are welded on the measuring cell**



**WEIGHT :**  
**TRANSMITTER ONLY :** - 3.5 KG (WITHOUT OPTION)  
**ADD :** - FLANGES WEIGHT (SEE TABLE)  
 - 0.3 KG FOR INDICATOR OPTION  
 - 2 KG FOR STAINLESS STEEL HOUSING OPTION

*FLANGES DIMENSIONS ACCORDING TO EN 1092-1 & EN 1759-1*

Seal diaphragms	EN 1092-1	EN 1759-1	ØE	F min	ØG	H	N x ØJ	ØK	ØM	Weight (kg)
SA G V Y □ □	DN 50 PN 10/40		165	20	102	2	4 x 18	125	59	3.3
SA H V Y □ □		NPS 2" CLASS 150	152	21	92	1,6	4 x 19	120,6	59	2.7
SA J V Y □ □		NPS 2" CLASS 300	165	22,5	92	1,6	8 x 19	127	59	3.7
SA 8 V Y □ □	DN 80 PN 40		200	24	138	2	8 x 18	160	73	5.8
SA 4 V Y □ □		NPS 3" CLASS 150	190	24	127	1,6	4 x 19	152,4	73	5.3
SA 6 V Y □ □		NPS 3" CLASS 300	210	28,5	127	1,6	8 x 22,2	168,3	73	7.8
SA 9 V Y □ □	DN 100 PN 16		220	22	158	2	8 x 18	180	96	5.9
SA 5 V Y □ □		NPS 4" CLASS 150	229	24	157	1,6	8 x 19	190,5	96	7.7
SA 7 V Y □ □		NPS 4" CLASS 300	254	32	157	1,6	8 x 22,2	200	96	12.7

X <sub>1</sub> X <sub>2</sub> X <sub>3</sub> X <sub>4</sub> X <sub>5</sub> X <sub>6</sub> X <sub>7</sub> X <sub>8</sub> - X <sub>9</sub> X <sub>10</sub> X <sub>11</sub> X <sub>12</sub> X <sub>13</sub> F K B □ □ □ V F - □ □ □ □ Y	Seal diaphragms X <sub>1</sub> X <sub>2</sub> X <sub>3</sub> X <sub>4</sub> X <sub>5</sub> X <sub>6</sub> X <sub>7</sub> S A □ V Y □ □	<b>SPAN LIMIT</b>	
		Min.	Max.
	FKB□□1	1,3 kPa (0,013 bar)	100 kPa (1,3 bar)
	FKB□□2	5 kPa (0,05 bar)	500 kPa (5 bar)
	FKB□□3	30 kPa (0,3 bar)	3 MPa (30 bar)

X <sub>1</sub> X <sub>2</sub> X <sub>3</sub> X <sub>4</sub> X <sub>5</sub> X <sub>6</sub> X <sub>7</sub> X <sub>8</sub> - X <sub>9</sub> X <sub>10</sub> X <sub>11</sub> X <sub>12</sub> X <sub>13</sub> F K M □ □ □ V F - □ □ □ □ Y	Seal diaphragms X <sub>1</sub> X <sub>2</sub> X <sub>3</sub> X <sub>4</sub> X <sub>5</sub> X <sub>6</sub> X <sub>7</sub> S A □ V Y □ □	<b>SPAN LIMIT</b>	
		Min.	Max.
	FKM□□1	0,016 bar abs	0,16 bar abs
	FKM□□2	0,013 bar abs	1,3 bar abs
	FKM□□3	0,05 bar abs	5 bar abs
	FKM□□4	0,3 bar abs	30 bar abs



**For PN > 50bar : reduced volume flanges are welded and bolted on the measuring cell**

**WITH DIGITAL INDICATOR**  
**WITH ANALOG INDICATOR**  
**ZERO/SPAN ADJUSTMENT**  
**CONDUIT CONNECTION**

code X4	CONDUIT CONNECTION
T	1/2 - 14 NPT
V	Pg 13,5
W	M20 X 1,5

113, 103, 21, 11, 171 (X6 = 1, 2, 3, 4), 173 (X6 = 5), 37, 38, 57, 126, 85, 43, 198 (X6 = 1, 2, 3, 4), 200 (X6 = 5),  $\phi Mb(L=0)$ ,  $\phi Mb(L \neq 0)$ ,  $\phi Ext$ ,  $\phi G$ , 105, 120, 144,  $\phi E$ ,  $N \times \phi J$ ,  $\phi K$ ,  $\phi Mb = \phi diaphragm$ ,  $\phi Ext = \phi extension$ , Wetted parts material

**Seal diaphragm**

Seal diaphragm	Extension L
SA00Y00	0
SA00A00	50
SA00E00	
SA00J00	
SA00P00	
SA00B00	
SA00F00	100
SA00K00	
SA00R00	
SA00C00	
SA00G00	
SA00L00	150
SA00S00	
SA00D00	
SA00H00	
SA00M00	
SA00T00	200
SA00*00	

**MOUNTING BRACKET FOR 2" PIPE ( $\phi 50$  MM)**

**FLUSHING RINGS DIMENSIONS**

EN 1092-1	EN 1759-1	TROUS / HOLES X	$\phi P$	$\phi R$	s
DN 50		1/4-18 NPT	102	70	30
DN 50		1/2-14 NPT	102	70	30
	NPS 2"	1/4-18 NPT	92	65	30
	NPS 2"	1/2-14 NPT	92	65	30
DN 80		1/4-18 NPT	138	91	30
DN 80		1/2-14 NPT	138	91	30
	NPS 3"	1/4-18 NPT	127	91	30
	NPS 3"	1/2-14 NPT	127	91	30
DN 100		1/4-18 NPT	162	116	30
DN 100		1/2-14 NPT	162	116	30
	NPS 4"	1/4-18 NPT	157	116	30
	NPS 4"	1/2-14 NPT	157	116	30

**FLANGES DIMENSIONS ACCORDING TO EN 1092-1 & EN 1759-1**

Seal diaphragms	EN 1092-1	EN 1759-1	$\phi E$	F min	$\phi G$	H	N x $\phi J$	$\phi K$	Weight (kg)	SS 316L		Exotic material	
										L=0 $\phi Mb$	L $\neq$ 0 $\phi Mb$	L=0 $\phi Mb$	L $\neq$ 0 $\phi Mb$
SA□□□□	DN50 PN40		165	20	102	2	4 x 18	125	3,3	59	48	59	48,3 (47)
SAH□□□□		2" CLASS 150	152	21	92	1,6	4 x 19	120,6	2,7	59	48	59	48,3 (47)
SAJ□□□□		2" CLASS 300	165	22,5	92	1,6	8 x 19	127	3,7	59	48	59	48,3 (47)
SA8□□□□	DN80 PN40		200	24	138	2	8 x 18	160	5,8	73	73	89	76 (72)
SA4□□□□		3" CLASS 150	190	24	127	1,6	4 x 19	152,4	5,3	73	73	89	76 (72)
SA6□□□□		3" CLASS 300	210	28,5	127	1,6	8 x 22,2	168,3	7,8	73	73	89	76 (72)
SA9□□□□	DN100 PN16		220	22	158	2	8 x 18	180	5,9	96	96	89	94 (89)
SA5□□□□		4" CLASS 150	229	24	157	1,6	8 x 19	190,5	7,7	96	96	89	94 (89)
SA7□□□□		4" CLASS 300	254	32	157	1,6	8 x 22,2	200	12,7	96	96	89	94 (89)

**WEIGHT :**  
**TRANSMITTER ONLY :** - 3.5 KG (WITHOUT OPTION)  
**ADD :** - FLANGES WEIGHT (SEE TABLE)  
 - 1 KG PER 50 MM EXTENSION  
 - 0.3 KG FOR INDICATOR OPTION  
 - 2 KG FOR STAINLESS STEEL HOUSING OPTION

**Seal diaphragms**  
 $X_1 X_2 X_3 X_4 X_5 X_6 X_7$   
 $F K B \square \square \square V F - \square \square \square \square Y$   
 $X_{11} = B, G$

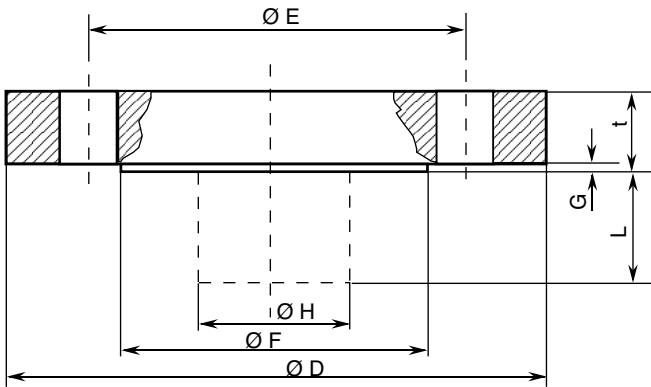
Seal diaphragms	SPAN LIMIT	
	Min.	Max.
FKB□□1	1,3 kPa (0,013 bar)	100 kPa (1,3 bar)
FKB□□2	5 kPa (0,05 bar)	500 kPa (5 bar)
FKB□□3	30 kPa (0,3 bar)	3 MPa (30 bar)
FKB□□4	100 kPa (1 bar)	10 MPa (100 bar)
FKB□□5	500 kPa (5 bar)	50 MPa (500 bar)

**Diaphragm seal :**  
 $X_1 X_2 X_3 X_4 X_5 X_6 X_7$   
 $S A \square \square V Y \square \square$

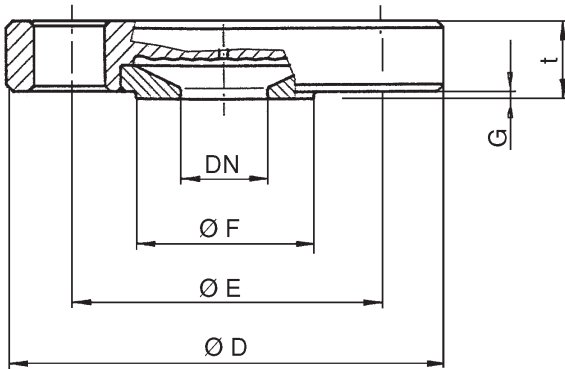
Diaphragm seal	SPAN LIMIT	
	Min.	Max.
FKM□□1	0,016 bar abs	0,16 bar abs
FKM□□2	0,013 bar abs	1,3 bar abs
FKM□□3	0,05 bar abs	5 bar abs
FKM□□4	0,3 bar abs	30 bar abs
FKM□□5	1 bar abs	100 bar abs

OUTLINE DIMENSIONS OF THE STANDARD DIAPHRAGM SEALS - FLUSH / EXTENSION (units : mm)

DN 50, 80, 100



DN ≤ 25 or 1"



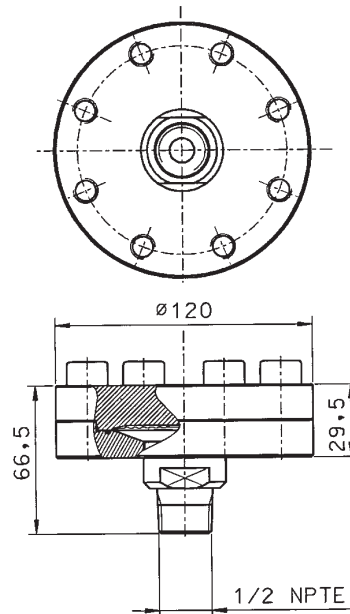
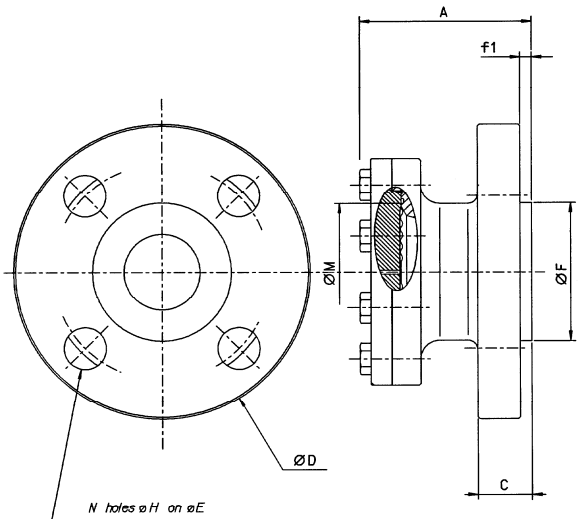
FLANGE DIMENSIONS ACCORDING DIN 2501 ET B16.5

DIN / ISO		ANSI		ØD	ØE	ØF	G	ØH	t	N x Øh
PN	DN	NP	NW							
40	15			95	65	45	2		22	4 x 14
40	20			105	75	58	2		22	4 x 14
40	25			115	85	68	2		22	4 x 14
40	50			165	125	102	3	48	20	4 x 18
40	80			200	160	138	3	73	20	8 x 18
16	100			220	180	158	3	96	20	8 x 18
20	15	150 lbs	1/2"	95	60,5	35	2		22	4 x 16
20	20	150 lbs	3/4"	100	70	43	2		22	4 x 16
20	25	150 lbs	1"	110	79,5	51	2		22	4 x 16
50	15	300 lbs	1/2"	95	66,5	35	2		22	4 x 16
50	20	300 lbs	3/4"	120	82,5	43	2		22	4 x 20
50	25	300 lbs	1"	125	89	51	2		22	4 x 20
20	50	150 lbs	2"	150	120,5	92	1,6	48	20	4 x 20
20	80	150 lbs	3"	190	152,5	127	1,6	73	24	4 x 20
20	100	150 lbs	4"	230	190,5	158	1,6	96	24	8 x 20
50	50	300 lbs	2"	165	127	92	1,6	48	22,5	8 x 20
50	80	300 lbs	3"	210	168,5	127	1,6	73	29	8 x 22
50	100	300 lbs	4"	255	200	158	1,6	96	32	8 x 22

OUTLINE DIMENSIONS OF DIAPHRAGM SEALS WITH ADAPTORS (units : mm)

Flange adaptor

Screwed adaptor



FLANGES DIMENSIONS												
DIN		ANSI		ØD	ØE			ØF	Cmin	f1	A	ØM
PN	DN	Pe	DN			N	ØH					
40	25			115	85	4	14	68	18	2	83	72,2
20	25	150	1"	108	79,5	4	15,8	50,8	16	1,6	81	72,2
50	25	300	1"	124	89	4	19	50,8	17,5	1,6	86	72,2
40	40			150	110	4	18	88	18	3	85	72,2
20	40	150	1 1/2"	127	98,4	4	15,8	73	18	16	85	72,2
50	40	300	1 1/2"	156	114,3	4	22,2	73	21	1,6	91	72,2

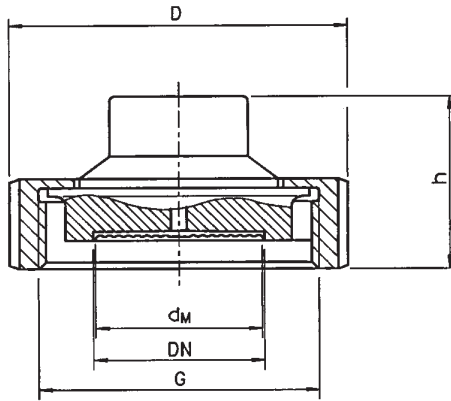
# OUTLINE DIMENSIONS OF SANITARY DIAPHRAGM (units : mm)

The seals for the sanitary and pharmaceutical applications are available DIN, SMS and Tri Clamp standards

Seals according DIN 11851 and SMS standard

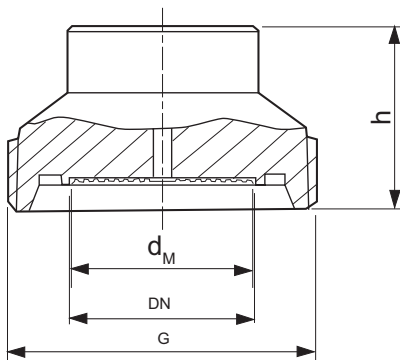
2 different designs exist for DIN 11851 and SMS : ( $d_M$  = diaphragm active diameter)

**Coupling nut design**



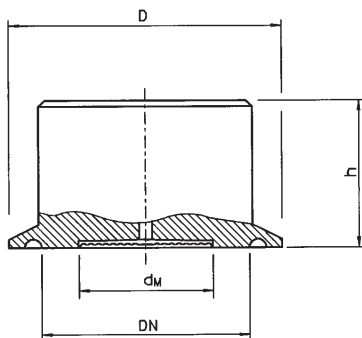
DIN 11851					
DN	PN (Max)	D	h	$d_M$	G
25	40	63	36	25	Rd 52 x 1/6
32	40	70	36	32	Rd 58 x 1/6
40	40	78	36	40	Rd 65 x 1/6
50	40	112	36	52	Rd 78 x 1/6
65	40	112	36	65	Rd 95 x 1/6
80	40	127	36	76	Rd110 x 1/4

**Male thread design**



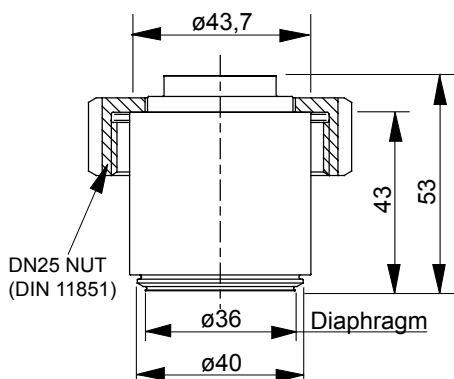
SMS					
DN	PN (Max)	D	h	$d_M$	G
25	40	51	38	25	Rd 40 x 1/6
32	40	60	38	32	Rd 48 x 1/6
38	40	74	38	40	Rd 60 x 1/6
51	40	84	38	52	Rd 70 x 1/6
63.5	40	100	38	65	Rd 85 x 1/6
76	40	114	38	76	Rd 98 x 1/4

**Tri Clamp design**

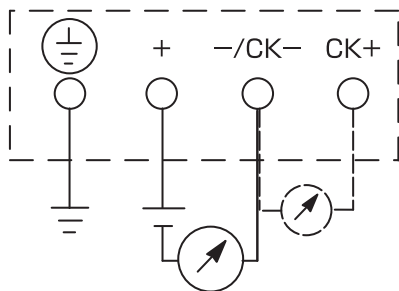


DN	PN (Max)	D	h	$d_M$
1"1/2	40	50,5	35	32
2"	40	64	35	40
2"1/2	40	77,5	35	50
3"	40	91	35	65

**Dead volume seal**



## CONNECTION DIAGRAM



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